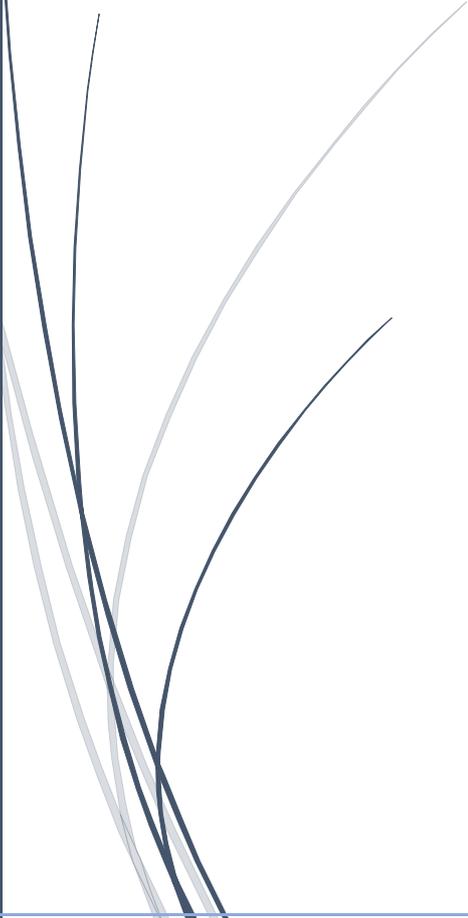


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*Evaluating factors that influence road rage in adults with different types of licence using stress, anger and anxiety*

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# Abstract

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The purpose of this study is to examine road rage among adults that have different licence types (learner/full) and the factors that influence this, in particular stress, anxiety and individuals anger level. A sample of 70 participants were recruited for this study. The study had 34 males and 36 females which were divided equally in two groups, drivers with full licence and driver with a learner's permit. Participants were measured on three different scales; the Propensity for Angry Driving Scale (PADS), Deffenbacher Driving Anger Scale (DAS) and The Depression Anxiety Stress Scales (DASS) which was split in two groups stress and anxiety. The design of this study is a correlation quantitative research design used to measure stress, anxiety and anger and their influence on road rage. The study discovered that both stress and anxiety had a significant relationship with road rage, but the licence types had no significant difference in relation to road rage with a sig value of 0.54.

# 1. Introduction

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In today's society, where the vast majority of people drive on a daily basis in order to reach their destinations, it is no wonder that road rage has become a serious issue. The term road rage was first introduced in 1988 (Fumento, 1988) and is defined in the 1997 Oxford Dictionary as "violent anger caused by stress and frustration of driving in heavy traffic". Some research suggested that this isn't quite accurate, some have described road rage as a cultural habit of retaliation that occurs as a result of frustration and can occur independent of heavy traffic (James and Nahl, 1998). In 1997, Vest, Cohen, and Tharp, reported that since 1990, aggressive driving had increased by 51%. Pepper (1997) reported that aggressive driving continues to increase about 7% every year. The AAA Foundation for Traffic Safety, in 1997, reported that since 1990, 218 deaths and 12,610 injuries occurred due to road rage.

The purpose of this study is to examine road rage among adults that have different licence types (learner/full) and the factors that influence this, in particular stress, anxiety and individuals anger level. Learner drivers are looked at as the less experienced drivers while the full licence drivers would have more experience and passed a full driving test. Learner drivers are usually the younger drivers, but some young driver can have a full licence while older drivers can still carry a learner's permit. The senior citizens have a very different driving style from younger drivers. Young men are the most susceptible to road rage, statistically. Whether this is due to a lack experience in driving, a predisposition to aggression or the straightforward fact that young men drive more than other age groups and gender groups, is still a subject of discussion (Brewer, A. M. (2000). In 2002, a Rage-Depression Survey was conducted (Wells-Parker, E., Ceminsky, J., Hallberg, V., Snow, R. W., Dunaway, G. & Anderson, B. (2002). The survey showed that men under the age of 21 were the most aggressive. Many studies have examined the epidemiological characteristics of people who commit road rage. The study by Smart and Mann (SMART, R. G., Stoduto, G., Mann, R. E., & Adlaf, E. M. 2004) concluded that individuals with road rage were mainly young, on average, 33 years of age and 96.6% male

Possible contributors to road rage among learner drivers have been identified, including personality variables associated with youth, examples are sensation seeking, as well as age-related risk-taking behaviours and the use of alcohol and cannabis (Hatfield & Fernandes, 2009; Jonah, 1990, 1997; Jonah, Thiessen, & Au-Yeung, 2001). Also included have been the lack of driving experience in young drivers and their over-confidence behind the wheel, which may contribute to a raising tendency to perceive the lapses and errors of other drivers as more frustrating and upsetting and possibly as more intentional (Lajunen & Parker, 2001). These perceptions, in turn, may contribute to increased anger and retaliatory aggression (Vallières, Bergeron, & Vallerand, 2005; Wickens, 2009; Wickens, Wiesenthal, Flora, & Flett, submitted

for publication). Mann et al. (2005) reported that factors linking with collision involvement varied across the lifespan. For younger drivers (18-34 years old), those who reported driving as stressful sometimes, who drank five or more drinks on an occasion, and who drank before driving had an increased risk of collision involvement. For middle-aged drivers (35-54 years old), those who reported cannabis use in the last year had an increased risk of collision involvement. For older drivers (55 years and older), none of these factors increased their risk of collision involvement. The current study sought to expand the findings of Mann et al. (2010) by examining differences in factors linked with self-reported aggressive driving and victimization across the same three age groups.

A major factor that lead individuals to aggressive driving is anger (Lajunen, T., & Parker, D. 2001). Anger is a very common emotion experienced in advanced Western societies (Scherer, & Wallbott, 1994). It is a response to frustration, interruption of a planned activity, violation of social personal expectations or an offense to oneself (Oatley, & Johnson-Laird, 1987; Lazarus, 1991; Schacter, & Singer, 1962). Angry people often attribute failure to an external and controllable cause (Weiner, 1985). In accordance with Berkowitz (1962) and Berkowitz et al. (2004), it has been said that driver's frustration and anger are highly related to aggression and traffic violation. Yagil (2001) found that drivers who are anxious or competitive and highly irritable are more likely to become aggressive when they are frustrated. This emotional state is associated with physiological changes, i.e., increase of heart rate, blood pressure reactivity (e.g., Smith, & Allred, 1989; Suarez, & Williams, 1990), and recognizable facial expressions and postures (Ekman, 1992). In previous theoretical research, Berkowitz (1962) came up with a hypothesis on the relationship between aggression and frustration. He believes that frustration does not necessarily cause aggression but merely to anger. Simply put, anger mediates the frustration aggression relationship. In a review of literature on the determinants of anger, Berkowitz and Harmon-Jones (2004) pointed out that a full development of anger through causal attributions and appraisals favoured hostility and aggression. Both of these can unfairly be directed towards innocent individuals who have not provoked it.

On the road, the main cause of anger is the traffic situation itself. That is to say, a driver's anger is a reaction to the offenses and violations of other users and the complexity of traffic (DePasquale, J. P., Geller, E. S., Clarke, S. W., & Littleton, L. C. 2001). A study by Stephens and Groeger (2006) exposed the notion that speed reduction was the only worthy cause of frustration and anger. In a simulator, drivers encountered different scenarios such as a pedestrian crossing the road, a lead car moving slowly etc. While behind the wheel, participants had to rate three emotions which were anger, frustration and calmness. The Results showed higher anger reports when drivers had to reduce speed. Here, it is believed that anger due to speed reduction is attributed indirectly to another users' responsibility. Your own behaviour is affected by another users' behaviour indeed. Mesken et al. (2007)

questioned the frequency, the determinants and the consequences of anxiety, happiness and anger in an on-road study combining self-reports, observed physiological measures and behaviour.

First, whilst driving, anger was found to be the second most frequently occurring emotion after anxiety. Following this, anger was estimated as a consequence of the violations of other drivers. Lajunen and Parker (2001) had also found that other people's anger level has distinct effects on the anger of a driver. Other people's rash driving was perceived as a legal violation which did not greatly affect behaviours whereas other user's hostility was a direct voluntary anger and could cause a response which is more severe. The link between anger and aggression depended on the situation and was modulated by age and gender. In a cross-cultural study including United Kingdom, Finland and Netherlands, Parker, Lajunen and Summala (2002) spotted that five main factors including "reckless driving", "impatient driving", "progress impeded", "direct hostility" and "inconsiderate driving" lead to anger and aggression. Yet, reactions differed between countries, modulated by age and gender. An example, reckless driving and impatient driving led to greater anger in United Kingdom than in Finland and Netherlands whereas inconsiderate driving provoked the greater anger in Finland. Also, males were more probable to react to these five sources of anger and older drivers reacted less to direct hostility but strongly sensitive to reckless driving. In regard to all the results, it is insisted that both anger and aggression behind the wheel depends on the situation, the characteristics of the driver and the social norms (Lawton, & Nutter, 2002; Schwebel et al., 2006; Britt, & Garrity, 2006; Sullman, 2006; Underwood, et al., 1999).

Another important factor to consider is stress. Stress is prevalent on roads because of the large number of influencing factors (e.g., heavy traffic, working hours, hostile stimuli such as horn-honking, etc...) Rush hours or individuals delayed to work could increase stress that can lead them to increasing speed or driving aggressively which leads to road rage. On the road, the main cause of stress is the traffic situation itself. In other words, a driver's stress is a reaction to other users' violations and offenses as well as the traffic complexity. A study by Stephens and Groeger (2006) brought to light the notion that speed reduction was the single important cause of stress and frustration. In a simulator, drivers encountered diverse scenarios such as a crossing pedestrian or a slow-moving lead car. But this can lead back to the factor of the driver's personality and individuals can react differently to certain situations. Shinar (1998) argued that stress resulting from delays and traffic congestion is a contributor to aggressive driving. This study examined drivers' reactions to a situation in which the driver ahead of them did not move when the traffic light turned green. Shinar found that when the light the participants were at only stayed green for a short amount of time, they were quicker to honk

than when they were at a light which remained green for a longer period of time. He also found that drivers were quicker to honk during weekday rush hours than during the weekend.

A study, carried out by MIT (Thompson, A. G. 1984), created a 'Road Frustration Index,' saying aggressive road conditions like getting side-swiped can cause nearly as much stress as sky diving. Several nonspecific psychological factors may play a part in road rage. One factor is stress. A number of authors have underscored the role of high levels of general stress. Driving presents many stresses when a person is behind the wheel, this is because of high speeds and other drivers making different decisions or mistakes. A stressed driver's behaviour depends on their coping abilities. In General, drivers who scored high on aggression tests used direct confrontation strategies when faced with stress on the road. Strategies include swerving, attempting to fight the other driver, long horn honks and tailgating. As stress levels get higher, the possibility of an individual having road rage increases greatly. Additionally, if a person has road rage, their stress levels increase. Stress is a form of cognitive distraction that can notably impede the ability of a driver to notice and respond to hazards. Research has found that drivers who are affected by work-related stress are more likely to take risks while behind the wheel, speed and more likely to be involved in crashes.

Stress is a marked problem in the UK and worldwide. Research indicates stress accounts for 40% of all illnesses that are work-related in the UK. Even if a driver does not generally suffer from stress in everyday life, all drivers are introduced to stressful driving situations from time to time. Research has shown that angry drivers are more probable to take risks such as quickly switching lanes, tailgating, speeding and jumping red lights. Driving aggressively can in turn increase stress levels. Stress behind the wheel is a problem for many drivers. A Brake and Direct Line survey of UK drivers established that 71% had lost concentration behind the wheel in the past year due to stress or annoyance. The greatest reason for this was the behaviour of other road users (60%), followed by stress about personal issues (44%) and work-related stress (39%).

Stress can also affect other factors such as anger and this how the factors on this study will link to each other. Stress has been looked at as a contributing factor to raised anger (Galovski & Blanchard, 2004). Thus, everyday life stressors such as work stress, financial stress and personal problems, when mixed with stressful driving experience such as rush hour and traffic together with added effect of time pressure can create a ready climate for aggressive driving. The joint effect of driving stress along with aggressive driving behaviours can cause road rage which can be dangerous. Hennessy and Wiesenthal (1999) noted that driver stress have been

identified with raised aggressive driving, low concentration levels and increased accident occurrences.

The final factor that this research will look at is anxiety. Anxiety has been demonstrated to have deleterious effects on a driver's behaviour. Nevertheless, these negative effects are contrasted because anxiety is also associated with cautiousness. In a regression analysis, Shahar (2009) showed that high anxiety drivers adopted riskier driving with a larger number of errors, lapses and ordinary violations. In contrast, Garrity and Demick (2001) demonstrated, in a correlational study of 163 participants, that tension and anxiety were related to cautiousness in driving. anxiety affects information processing and consequently driving performance, but its effects are dependant on the driving situation and obviously on the driver's anxiety level and coping strategies.

According to Epstein (1972), anxiety is due to an unresolved fear related reaction (i.e., flight). Otherwise speaking, the lack of reaction when facing a danger leads to a latent tension and uneasiness linked to rumination and worry. Ohman (1993) put forward an alternative definition in which anxiety is a response to an unrecognizable threatened stimulus, interfering with processing of other tasks. Eysenck and Byrne (1992) showed the influence of anxiety on performance of a detection task. Low, medium and high trait-anxious groups were needed to respond to one letter presented in an uncured location and to ignore word distractors. Valence of distractors was manipulated: neutral, positive, physically threatening and socially threatening. In Comparison to the low and medium trait-anxious groups, high trait-anxious participants were more vulnerable to be distracted and this effect was greater for physically threatening words. Yet, the variability between groups led Eysenck et al. (1992) to come to conclusion that the sensitivity to distraction in trait-anxiety depends on cognitive vulnerability factor for 9 generalized anxiety disorders. Attentional bias due to anxiety increases doubt about the consequences in a high attentional-demand task for instance driving.

As with anger, anxiety has been found to be highly related to driving. In this sense, anxiety depends on the driving situation complexity, other users' behaviour and traffic density. In regard to the conclusions drawn by Eysenck et al. (1992), also, it is argued that anxiety relies on the personal characteristics of the driver (Taylor, Deane, & Podd, 2007). For example, Banuls Egeda et al. (1996) created a questionnaire named the Inventory of Situations provoking Anxiety in Traffic (ISAT) to evaluate anxious reactions to driving. They compared answers to ISAT and self-reported accidents of professional drivers and novice drivers. Novice drivers reported anxiety when they had to asses a situation involving a greater risk of accidents whilst professional drivers reported anxiety when they had to face impediments or delays in their

journey. Shoham et al. (1984) also examined the link between driving performances and anxiety using self-reported measures. They deduced that anxiety is an answer to the need for fast driving reactions on the road, causing anxious drivers to become traffic offenders. These studies clarify the fact that anxiety is not only a personality trait, but it is also connected to driving.

In summary, anxiety may deteriorate, help or may have no effect on driver's behaviour. These varying conclusions may have resulted from the diversity of methodologies and the use of variable definitions of anxiety. Also, the leading conclusion is that anxiety affects information processing and as a consequence, driving performance. However, its effects depend on the driving situation and clearly on the anxiety level of the driver and their coping strategies.

Previous studies researched about road rage as a single topic with very little comparison to factors that can influence. Some research studies look at influences of road rage by focusing on one aspect like driver personality. Previous reports on road rage imply that most everyone who drives could be involved and affected by emotions. As victims, witnesses, perpetrators, or protectors, many drivers are confronted with at least some type of aggression and violence on the roadways. Despite inconsistent definitions and subsequent questionable measurements of road rage, formal social control efforts directed at problematic drivers seem to be the preferred approach for prevention. The purpose of this study is to examine road rage among adults that have different licence types (learner/full) and the factors that influence this, in particular stress, anxiety and individuals anger level. This study will develop previous research in several ways. First, to divide individuals into two comparable groups; Learners and Full license drivers. The question that this study will aim to answer is, there a significant difference in road rage among adults that have a full licence versus those that have a learner licence in terms of stress, anger and anxiety? This lead me to four hypotheses.

1. Adults with different licence types will show a significant difference in relation to road rage
2. Adults with different licence types will show a significant relationship between road rage and stress
3. Adults with different licence types will show a significant relationship between road rage and anxiety
4. Adults with higher levels of anger will show greater scores in road rage

## 2. Methods

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This section of the thesis is divided into four parts; *participants* that were used to conduct the study, *design* that was used in the study, *materials* that were used (scales) and *procedure* of the study.

### 2.1 Participants

A sample of 70 participants were recruited for this study. Participants for this study will be individuals of mix gender (males and females) gathered from a population in Ireland using purposive sampling. The sample had a very close division of gender with 34 males and 36 females. The males had (mean= 1.41 and SD= 0.49) and females had (mean= 1.58 and SD= 0.50). All participants will be adults with aged 18 and over and carry either a full Irish licence or a learner's permit. The sample was divided equally into two groups; drivers with a full licence and drivers that carry a learner's permit. The full licence group had a mean= 1.43 and SD= 0.50) while the learner group had mean (1.60 and SD=0.49). All participants will be asked to fill out the same questionnaire and will be informed that the circumstances to participate are for course credit. It was presumed that the participants drive on a weekly basis.

### 2.2 Design

The design of this study is a correlation quantitative research design used to measure stress, anxiety and anger and their influence on road rage. The reason I chose this design is because it measures two or more quantitative variables from the same group of participants. My independent variable is Road Rage, this variable contains a sub group which contains two types of licence; participants with full licence and participants with a learner permit. My dependent variables are stress, anxiety and driver anger level. Participants were divided into two groups; drivers with full licence and drivers with learner permission. Both groups had equal number of participants n=35.

### 2.3 Materials

Participants were measured on three different scales; the Propensity for Angry Driving Scale (PADS), Deffenbacher Driving Anger Scale (DAS) and The Depression Anxiety Stress Scales (DASS) which was split in two groups stress and anxiety. The primary objective is to see what factors influence road rage. For road rage the **Propensity for Angry Driving Scale (PADS)** will be used. The PAD scale is used to assesses what respondents would do in a number of driving situations, as well as making inferences about the severity of anger experienced. The PADS

contain 19 items and reports an adequate internal consistency (Cronbach's alpha of 0.633). Participants were told "The following questionnaire contains 15 scenarios one might encounter while driving. Please read each of the scenarios carefully and then decide which of the potential responses most closely matches how you would respond in that situation "An example question would be ". You are driving your car down a two-lane road. Without warning, another car pulls out in front of you from a car park. You had to brake suddenly to avoid hitting it. How do you respond?" (DePasquale et al., 2001).

For the stress and anxiety factor The **Depression Anxiety Stress Scales (DASS)** was used. The DASS is a set of three self-report scales designed to measure the negative emotional states of depression, anxiety and stress. The subscales that will be used are the DASS-Stress and DASS-Anxiety subscales. The scale had a Cronbach's alpha score of 0.944. Participants were instructed to read question carefully and answer with a rating scale of 0-3 with 0 not applying at all and 3 Applied very much. An example question would be, "I found myself upset rather easily". Participants had to answer with the rating scale provided

For individual's anger levels, **Deffenbacher Driving Anger Scale (DAS)** was be used. Deffenbacher Driving Anger Scale is the short version of the DAS presents fourteen different situations and asks the responding driver to report the degree of anger that each situation makes them feel. Participants were instructed to "Imagine that each situation described below was actually happening to you and rate the amount of anger that would be provoked." And answer with a rating scale of 1-5 with 1 being none at all and 5 being very much. An example question that would be asked in the DAScale is "Someone is weaving in and out of traffic". The scale had a Cronbach's alpha score of 0.875.

## *2.4 Procedure*

The study was a quantitative study in which online questionnaire were distributed. The questionnaires were published online to Facebook, linked in and questionnaire link will be attached to Instagram bio to be able to gather all participants required for this study. After gather a total of 70 participants the data was then moved to Microsoft excel in which all answers were coded and prepared for analysis and running tests. The data was then moved into a program called SPSS. The data was analyzed using the SPSS program. The program was used to test for each of the hypothesis. For the first hypothesis an independent t-test would be appropriate to use which can show two group differences because this test compares two sample means to determine if there are significant differences. For the last three hypothesis which are investigating relation between the DV and the IV a correlational test would be appropriate, so I ran a Pearson's r.

## 3. Results

This section of the thesis is divided into two parts; *descriptive statistics* and *inferential statistics*. Descriptive statistics of the study will give detail discussion of the data, gender break down and division of groups. The inferential statistics will provide write up result of each hypothesis accompanied by graphs.

### 3.1 Descriptive Statistics:

This research study involved seventy (n=70) participants in total. The study required participants that carry either a full licence or a learner permit and drive on a weekly basis. The participants were divided equally into two groups; drivers that carry a full licence (n=35 ,50%) and drivers that carry a learner’s permit (n=35, 50%). The data had a mean of 1.5, a median of 1.5 and a mode of 1.0. The participants for this study were Irish adults with a mix gender, the study had thirty-four males (n=34, 48.6%) and thirty-six females (n=36, 51.4). see table 1 below for full details of participants and scales used in the study.

Table 1

<i>Scales</i>	PADS		DAS		DASS_stress		DASS_anxiety	
	full	learner	full	learner	Full	learner	full	learner
Licence type								
mean	35.03	34.14	42.54	43.06	7.66	7.89	5.66	7.31
SD	4.56	7.35	9.23	12.31	5.34	4.81	5.31	4.43
Min	28	15	22	23	.00	.00	.00	.00
Max	45	60	65	65	20	20	18	16
variance	20.79	54.0	85.2	151.47	28.47	23.11	28.17	19.63
skewness	.188	.403	.271	.341	.653	.341	.999	.018
kurtosis	-.851	4.95	.542	-.161	-.234	-.161	-.016	-.878
Cronbach alpha	.633		.875		.944		.944	

Participants were measured on three different scales; the Propensity for Angry Driving Scale (PADS), Deffenbacher Driving Anger Scale (DAS) and The Depression Anxiety Stress Scales (DASS) which was split in two groups stress and anxiety. These scales were used to compare the driver with two licence types; full licence and learner permit. The PADscale had a mean of 34.6, the DAScale with a mean score of 42.8 and DASS(stress) with a mean score of 7.8 and finally DASS (anxiety) with mean score of 6.5. The comparison between the licence types on different scales is seen on the chart below (figure 1).

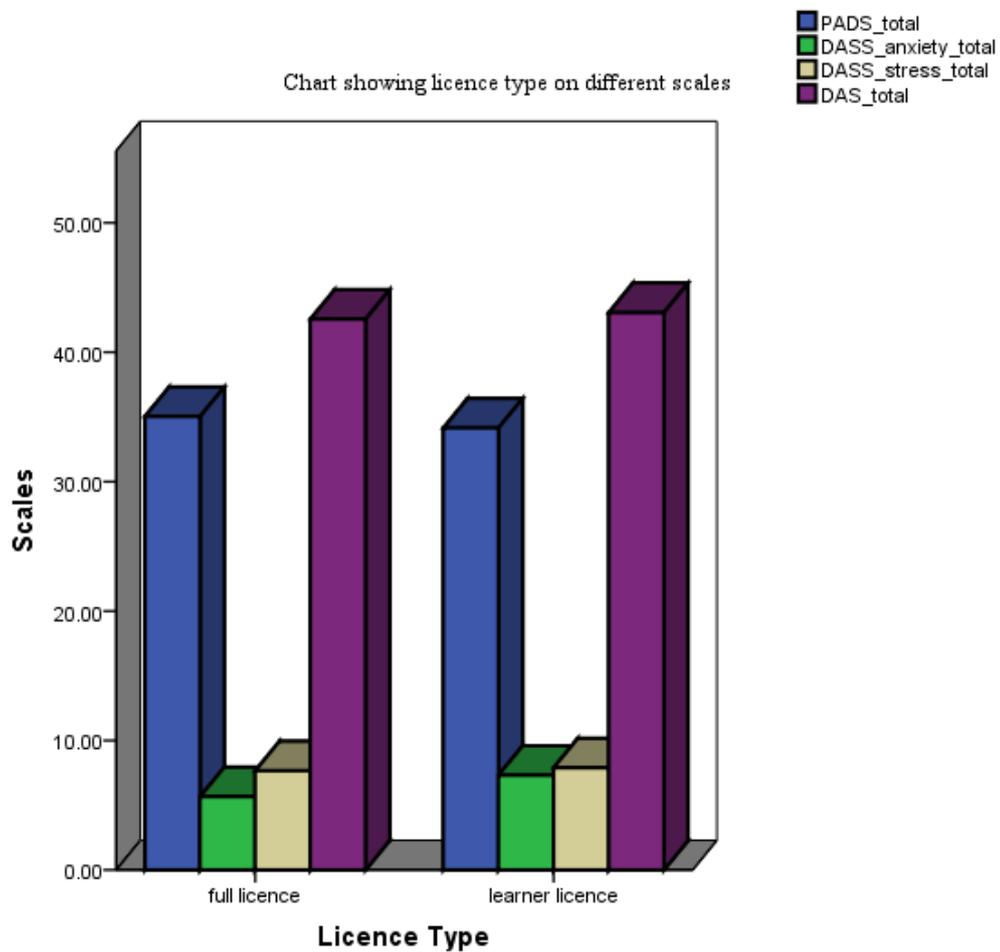


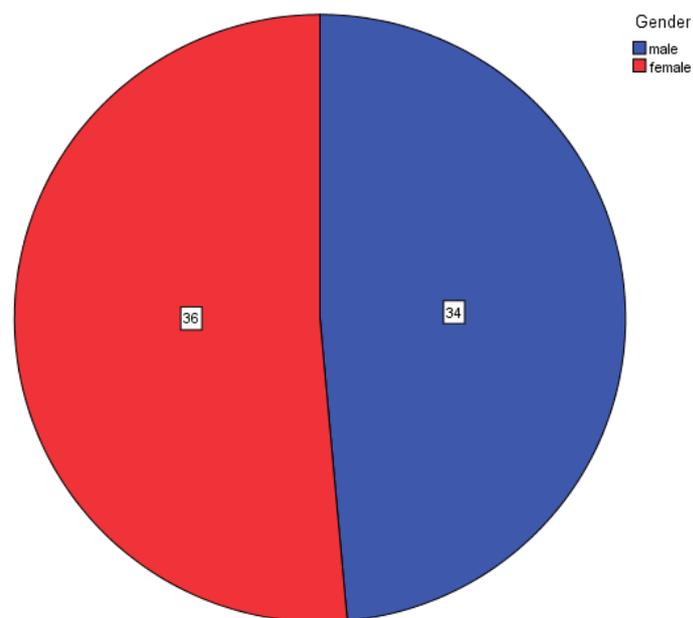
Figure 1

In terms of gender breakdown and division of licence types, the study had all participants over 18 and as mentioned above with a total of 34 males and 36 females. The males had (mean= 1.41 and SD= 0.49) and females had (mean= 1.58 and SD= 0.50). The participants were divided equally among two licence types. (full n=35, learner n=35). The full licence group had a mean= 1.43 and SD= 0.50) while the learner group had mean (1.60 and SD=0.49). Table above shows the variables separated with total scores (see table 2).

**Table 2**

Variables	Male	Female	Full licence	Learner
Frequency	34	36	35	35
mean	1.41	1.58	1.43	1.60
SD	0.49	0.50	0.50	0.49
median	1.0	2.0	1.0	2.0

Figure below shows how the division of gender in the study. The number of both males and females was almost equal with males covering 48.6% of the study and females covering 51.4%. (see figure 2)



**Figure 2**

### 3.2 Inferential Statistics:

*Hypothesis 1: Adults with different licence types will show a significant difference in relation to road rage*

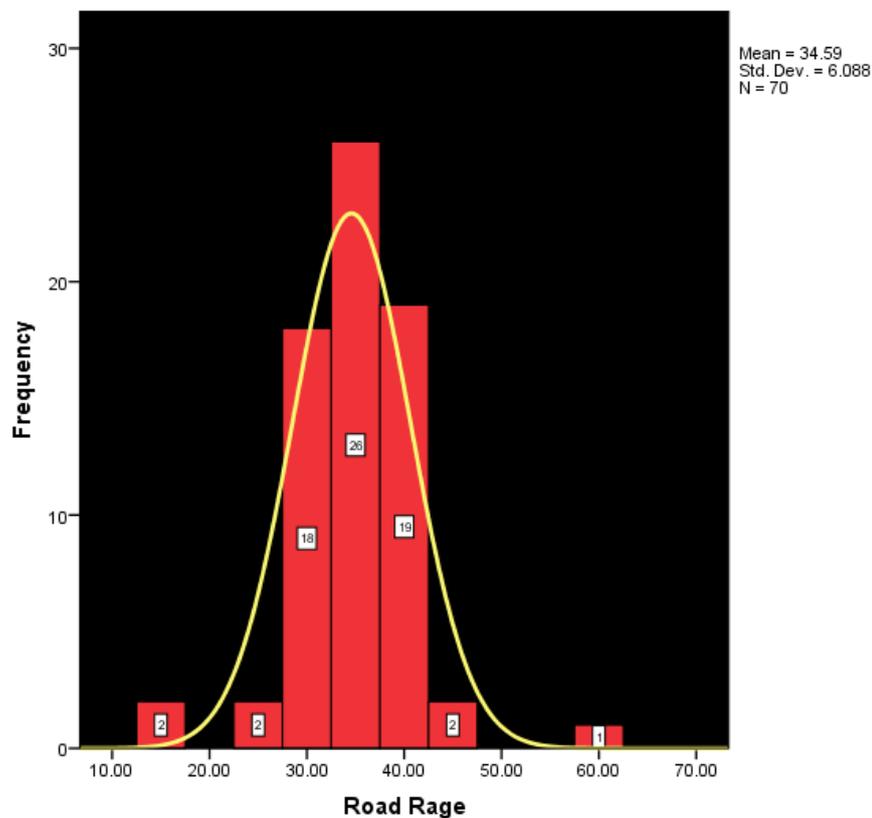


Figure 3

#### Hypothesis1

*Adults with different licence types will show a significant difference in relation to road rage*

An independent-samples t-test was conducted to compare full licence drivers and learner drivers in relation to road rage. The independent samples t-test found that there was no statistically significant difference between drivers with full licence (M= 35.03, SD= 4.56) and learner drivers (M= 34.14, SD= 7.35) ( $t(68) = .606, p = .547, CI(95\%) -2.04 \rightarrow 3.81$  in terms of road rage). Therefore, the null can be accepted. Histogram above shows frequency distribution of road rage among the two licence types collected by PADScale (see figure 2)

**Hypothesis 2:** Adults with different licence types will show a significant relationship between road rage and stress

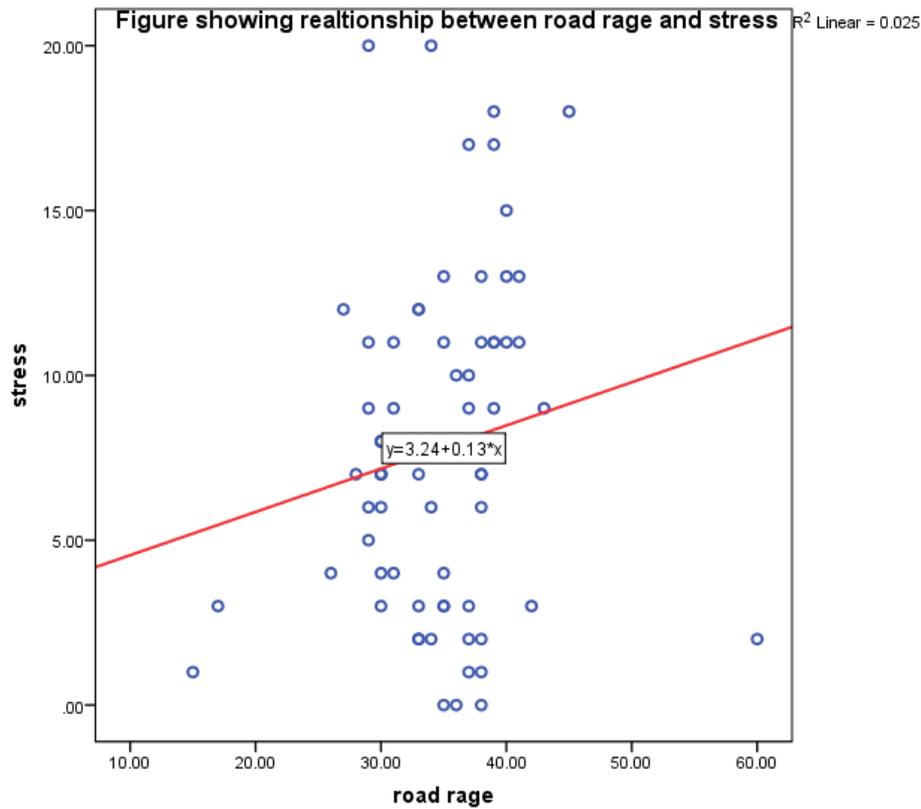


Figure 4

### Hypothesis 2

Adults with different licence types will show a significant relationship between road rage and stress

A Pearson product-moment correlation coefficient was computed to assess the relationship between stress and road rage. Road rage (M=34.59, SD=6.09) and stress (M=7.77, SD=5.04). There was a positive correlation between the two variables, ( $r = 0.158$ ,  $n = 70$ ,  $p = 0.0190$ ) A scatterplot summarizes the results (Figure 2) Overall, there was a positive correlation between stress levels and road rage. Increases in stress levels were correlated with increases in rating of road rage. Therefore, the null hypothesis is rejected. This relationship can account for 2% of variation of scores. The results show that stress and road rage have a relationship and that stress can be an influence that leads to road rage.

**Hypothesis 3:** Adults with different licence types will show a significant relationship between road rage and anxiety

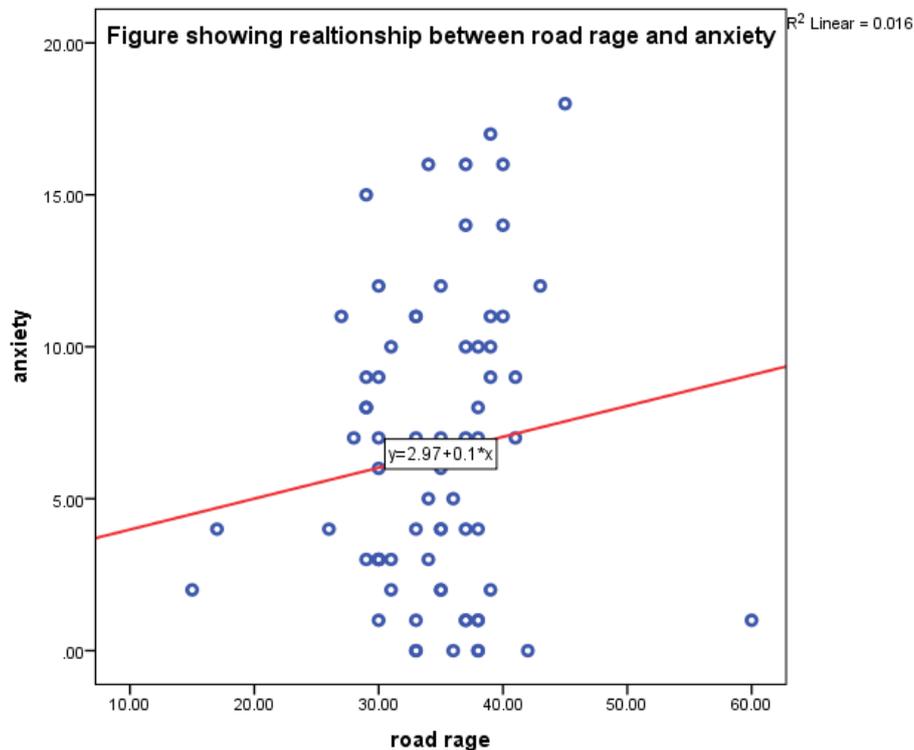


Figure 5

Hypothesis 3:

Adults with different licence types will show a significant relationship between road rage and anxiety

A Pearson product-moment correlation coefficient was computed to assess the relationship between anxiety and road rage. Road rage (M=34.59, SD=6.09) and anxiety (M=6.49, SD=4.93). There was a positive correlation between the two variables, ( $r = 0.126$ ,  $n = 70$ ,  $p = 0.030$ ) A scatterplot summarizes the results (Figure 2) Overall, there was a positive correlation between stress levels and road rage. Increases in stress levels were correlated with increases in rating of road rage. Therefore, the null hypothesis is rejected. This relationship can account for 2% of variation of scores. The results show that anxiety and road rage have a relationship and that anxiety can be an influence that leads to road rage.

**Hypothesis 4:** Adults with higher levels of anger will show greater scores in road rage

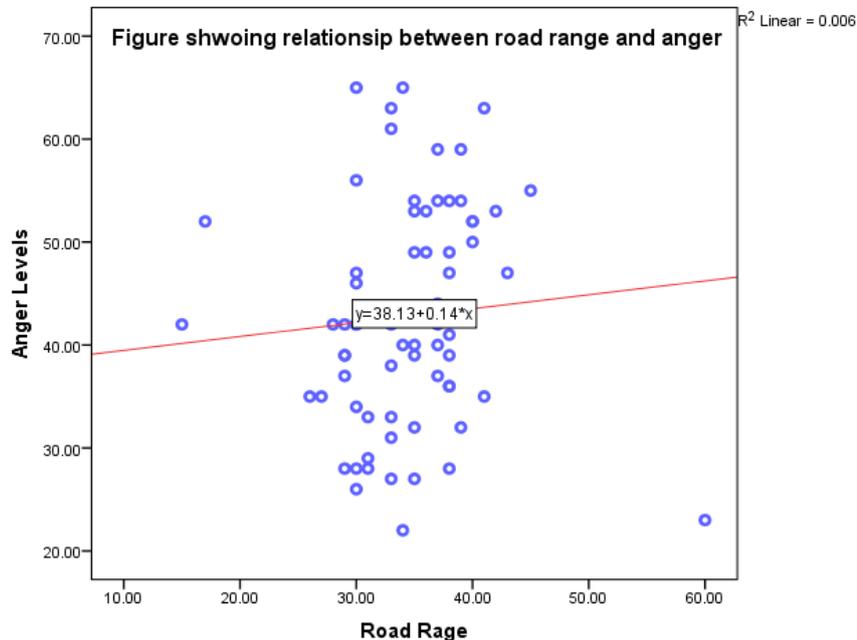


Figure 6

Hypothesis 4:

*Adults with higher levels of anger will show greater scores in road rage*

A Pearson product-moment correlation coefficient was computed to assess the relationship between anger and road rage. Road rage ( $M=34.59$ ,  $SD=6.09$ ) and anger ( $M=42.8$ ,  $SD=10.8$ ). There was a positive correlation between the two variables, ( $r = 0.076$ ,  $n = 70$ ,  $p = 0.531$ ). but the two variables are not statistically significant. Therefore the null hypothesis can be accepted.

Overall all hypothesis aimed to investigate what could influence road rage. Hypothesis 1 purpose was to discover if different licence types would have significant differences in terms of road rage, but results came out insignificant. Both hypothesis 2 and 3 aimed to investigate about the relationship between stress, anxiety towards road rage. Both came out significant. Hypothesis 4 carried the surprising result of anger not having an influence on road rage. Further in discussion section.

## 4. Discussion

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Multiple studies prove the role of emotions in influencing driving efficiency among people of different age groups, gender, social status, religion, education level, and cultural backgrounds. This research aimed at determining whether there is a significant difference in road rage between fully and learner licensed adults by evaluating three emotional variables: stress, anger, and anxiety. Data collection included a sample of 70 individuals who carried their driving licenses every week. The ratio of participants bearing the full permit versus the learner permit was 1:1. The number of male and female participants was recorded as 34 and 36 respectively. All participants were aged above 18 years. Four scales were used to measure the primary variables of the study. These included the Propensity for Angry Driving Scale (PADS), Deffenbacher Driving Anger Scale (DAS), and The Depression Anxiety Stress Scales (DASS). Further, DASS was divided into two: DASS (stress) and DASS (anxiety). The research was based on four structured hypotheses, which guided the data collection and analysis processes.

The first hypothesis questioned whether adults with different license types share a significant difference in road rage. Findings supported the null hypothesis, which mentions a lack of correlation between fully and learner licensed drivers with road rage. Studies conducted by Smart et al. (2004) and Wells-Parker et al. (2002) suggest a positive relationship between driver license type and road rage. These scholars contend that most people with road rage behaviours are young ( $\leq 33$  years). Adventurousness, poor management of emotions, and high alcohol and drug consumption are some of the factors behind aggressive and enormous road rage among this group (Wickens et al., 2010). The inability to handle stress and deal with frustrations prompts the resurgence of irate behaviours to address the emotional void. Mixed emotions breed anger, which forces drivers to direct blame to other individuals. On the other hand, experienced drivers, mostly aged  $\geq 35$  years, are skilled at handling stressful situations (Wickens et al., 2010). The primary source of anger within this group often emanates from reckless driving behaviours. Nevertheless, the results of the current study refute these arguments through their different outcomes. These findings showed that the differences in road rage among experienced (full licensed) and novice (learner permit) are statistically negligible differences. The literature body is deficient of scholarly investigations that focus on identifying the core relationship between the two types of drivers and road rage. Instead, multiple scholars have established the important role of variables such as personality, driving style, predisposed situation, and emotions (stress, anger, and anxiety) as contributors to road rage behaviour.

Personality can be interpreted by focusing on the trait of driving anger. This trait influences the reactions likely to be displayed by drivers following exposure to different situations while on the road. Individuals who are high in the driving anger trait become aggressive quickly and engage in risky behaviours. However, those with a low score on the quality are slow to grow angry and aggression (Sullman, Stephens & Yong, 2015). The likelihood and frequency of engaging in risky driving habits, such as reckless driving and traffic violations, and causing

accidents subside among these individuals. On the other hand, driving style explains the habitual tactics displayed while driving, often analysed by observing the attributes of attentiveness, speed, compliance with traffic regulations, and the attitudes displayed towards other drivers and pedestrians. A person's driving style is often influenced by personality, the confidence of one's skills and capabilities, personal values, and the interpretation of good driving habits. Bearing this aspect in context, the diversity in driving styles within study driver categories influenced the negligible statistical variance.

The second hypothesis investigated whether adults with different forms of licenses show a significant relationship between road rage and stress. Findings showed a positive correlation between stress and road rage. Most researchers admit that driving is stressful. Besides stress associated with personal life, workplace problems, and traffic, it is common for drivers to experience psychological pressure, which can catapult to unmanageable levels if not addressed carefully. Stress blurs individual thinking, regardless of age or driving experience, and makes it difficult for people sitting behind the wheel to make wise decisions. People handle and react to situations differently. Efficient driving depends on the ability to manage stress.

The cognitive model developed by Lazarus and Folkman explains the concept of stress comprehensively. It also highlights the conventional techniques used by individuals to deal with stress-filled exposures (Shamo-Nir & Koslowsky, 2010). According to these scholars, humans utilize two coping styles when stressed. In the first strategy, they may try to understand and structure practical ways to solve the existent problem. This method emulates the normal problem-solving process: situational evaluation, determining the source of the problem, brainstorming to find alternative solutions, weighing the answers, and implementing the best option. In the second coping strategy, people focus on their emotions by adopting behaviours like suppression, selective attention, redirecting blame, maintaining distance, and looking for positive elements with the predisposed situation. Based on the cognitive theory, people who cannot cope with stress efficiently can adopt hostile, aggressive driving habits. In their study, Popușoi and Hollman (2016) determined that people who suppress their emotions more frequently tend to display extreme aggression if subjected to irate situations while driving. In spite the study's focus on the emotions management strategies utilized by drivers while in traffic, its findings can be interpreted to mean a positive correlation between stress and driving rage. Shamo-Nir and Koslowsky (2010) also determined an existent association between stress, coping methods, and aggressiveness in their studies. Hostile aggressiveness encourages road rage behaviours through the build-up of harmful perceptions regarding other drivers and high impatience. Negative perceptions instigate an extreme annoyance and unwarranted hostility while driving. Instead of paying attention to the road, drivers redirect their efforts to outshine and sometimes hurt other road users. Lack of patience encourages confrontational behaviours and the violation of traffic rules (Sullman, Stephens & Yong, 2015). Activities associated with such behavioural orientations include swerving, tailgating, switching lanes, frequent overtaking, speeding and nonadherence to traffic lights, and horn honking.

The third hypothesis investigated whether adults with different license types show a significant relationship between road rage and anxiety. The outcomes of the current study showed that anxious drivers are more susceptible to road rages compared to non-anxious drivers. The data provide conclusive results about the ability of anxiety to increase the risk of road rage behaviours. These outcomes are supported by statistics from different empirical studies conducted over decades. Yagil (2001) proved that anxious and highly irritable people become more aggressive when subjected to situations that give rise to feelings of frustrations. Contemporarily, the main sources of anxiety among drivers include life experiences, personality, and stress. Stress increases the chances of PTSD, panic disorder, and generalized anxiety disorder. As Nesbit, Conger and Conger (2007) point out; people who become anxious while driving experience mixed feelings, which impair their abilities to handle given tasks effectively. During such exposures, they may find it difficult to follow the most basic instructions for operating motor vehicles. Anxious drivers are likely to make mistakes compared to non-anxious drivers. Errors may be visible in the form poor adjustment of speed and breaks, over speeding and driving on the wrong side, which bears strong associations with road rage. Anxiety has also been associated with hostile aggressiveness with repulsive behaviours like horn honking, yelling, honking and obtrusive gesturing. Anxious drivers engage in risky behaviours and share strong thoughts and feelings about their knowledge and skills (most believe they are less skilled). Additionally, some drivers who suffer the symptoms of anxiety emulate cautionary driving to elevate the perception of safety (Nesbit, Conger & Conger, 2007; Dula et al., 2010). Activities and behaviours adopted in such circumstances include speed reduction, maintaining an extensive distance with the lead car, and slowing down at intersections. The downsides of such coping strategies are often visible in violation of traffic laws and reduced patience in other drivers. When forced to drive at standard speeds, alteration in speeds place not only their lives but also other road users at risk.

The fourth hypothesis sought to determine adults with higher levels of anger show greater scores in road rage. The findings noted a positive correlation between higher levels of anger with greater scores in road rage. Anger is considered one of the most problematic emotions because of its close links with aggression, loss of self-control and violence. It strains interpersonal associations between family, friends, acquaintances, or even strangers resulting in damaged relationships. Unfortunately, while some people show an intrinsic ability to suppress such emotions, it is increasingly difficult to subdue their occurrence in other people leading to its outright expressiveness. Through their empirical studies, scholars such as Shamo-Nir and Koslowsky (2010), Neighbors, Vietor and Knee (2002) and Popușoi and Holman (2016) have ascertained the ability of anger to brew aggression among drivers. Human beings display two forms of aggression, hostile or instrumental. Instrumental aggression often prompts drivers to evade the people or events that introduce discomfort. Reactions typical of such cases include speeding off or swerving. This form of aggression is not associated road rage. On the other hand, Drivers who display hostile aggression embrace confrontational strategies when frustrated or faced with situations that bother them. Behaviours adopted after that often purpose to hurt or cause harm to the perceived source of problems. Such actions may include horn honking, yelling under closed windows, swerving to block the road, using car lights to show anger, and insulting other drivers among others. Road rage can surface either surface in mild or extreme forms. High outrage elevates aggressiveness thus engagement in severe forms

of road rage, which include insults using gestures, swerving, and deliberate tailgating. Studies have also shown that individuals who tend to express hostile aggression consume alcohol and drugs before driving. Some are habitual speeders whose reckless driving causes accidents.

This study implemented the basic guidelines for conducting social research studies. However, the findings cannot be generalized because of several reasons. Firstly, the sample size is too low, therefore inhibits the generalizability of the results. Using a participant number of seventy is very small based on the area's extensiveness and the population that uses personal and public vehicles to commute. This factor might have influenced the results gathered for the first hypothesis. Perhaps, the large sample size would generate contrary outputs. Secondly, previous investigations have recorded notable differences between driver behaviours across global boundaries. A cross-cultural study conducted in the United Kingdom, Finland, and the Netherlands to identify the underlying relationship between anger and aggressive driving showed imminent distinctions in the way drivers in these countries reacted to five variables under assessment. These included "reckless driving," "impatient driving," "progress impeded," "direct hostility" and "inconsiderate seven driving." The current study was conducted in Ireland, which means that the possibility of obtaining similar or contradictory results in other localities remains inevitable. Third, the study was exposed to researcher bias since only one person oversaw the data collection process.

This research presents some strength despite the limitations outlined above. The findings introduce a contravening thought regarding the existence of intricate differences between adults who possess a full driver's license and a learner's permit. This conflict questions the conventional perception that often positions new drivers as more likely to engage in aggressive stunts in traffic compared to experienced drivers. This factor examines the previous findings and sets a pathway for future studies. Moreover, the research utilized both observations and interviews to generate data, unlike other former studies that merely focused on researcher observations. As a result, it was possible to create comprehensive and convincing outcomes.

## ***Conclusion***

Aggressive driving is among the lead causes of traffic accidents and deaths across the globe. The mortality rates attributed to these driving habits have ignited the need to investigate and highlight the occurrence and prevalence of such behaviours within the society. Ironically, licensed drivers engage in reckless and inconsiderate behaviours despite receiving apt training on proper driving habits. The literature body is flocked with multiple research studies that address the concerns and contentions surrounding road rage. The current study sought to investigate if there is a significant difference in road rage between full and learner licensed adults by evaluating the variable of stress, anger, and anxiety. While previous studies seem to have identified an undoubted difference between new and experienced drivers, the current research fails to auger with these presentations. This study provides non-significant variations between driving experience (fully licensed and learner permits) and road rage because driving behaviours have commonly been associated with individual personalities, driving style,

situational context, alcohol and drugs consumption, and emotions. Results exploring the role of emotions in the spiralling substandard driving habits show a full link with the current research. Stress, anxiety, and anger are the lead propagators of deteriorated driving habits. Stress employs drivers to structure ways to transfer fault to other people, resulting in activities and behaviours that seek to hurt other road users as a means of moving frustrations. Such acts include switching lanes, swerving, tailgating, frequent overtaking, speeding and nonadherence to traffic lights, and horn honking. Anxiety causes road rage behaviours among adults through three techniques: exaggerated cautious, hostile aggressiveness, and impairment of individual ability to oversee standard tasks. Moreover, drivers who cannot suppress their anger express themselves through aggressive behaviours. Instrumental aggression does not cultivate road rage among drivers. Depending on the displayed behaviours, hostile aggression can be mild or extreme. The difference between the two forms of aggressiveness stems from the nature of the introduced harm. Therefore, the higher the stress levels, the higher the road rage scores.

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# Appendices

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## A. The Propensity for Angry Driving Scale

The following questionnaire contains 15 scenarios one might encounter while driving. Please read each of the scenarios carefully and then decide which of the potential responses most closely matches how you would respond in that situation.

1. You are driving your car down a two-lane road. Without warning, another car pulls out in front of you from a car park. You had to brake suddenly to avoid hitting it. How do you respond?

- (a) Let out a sigh of relief and drive on
- (b) Lean out your window and yell at the other driver
- (c) Honk your horn to let the other driver know they almost caused an accident
- (d) Follow the car to its destination so you can give the driver a piece of your mind

2. You are driving your car down the highway in the overtaking lane. You come up to a car driving much slower than you are in the overtaking lane. Even though you flash your high beams as a signal for the other car to move over, it does not. How do you respond?

- (a) Make an obscene gesture to the driver as you pass on the left
- (b) Shrug your shoulders and continue to wait for the other car to move to the side
- (c) Alternate between honking your horn and yelling obscenities out the window
- (d) Lay on your horn and don't budge until the driver moves

3. You are driving on a single lane road. For no apparent reason the car in front of you is constantly braking and accelerating, causing you to drive in the same manner. How do you respond?

- (a) Honk your horn and loudly curse at the driver

- (b) Slow down a little and keep a safe distance
- (c) Deliberately tailgate the car and occasionally lay on the horn
- (d) Curse to yourself but continue at the pace set by the other driver

4. You are in a full car park. You see a driver leaving and you put on your blinker to indicate that you intend to take the parking spot. As the other driver pulls out, a second driver cuts in front of you from the other side and takes the parking spot. How do you respond?

- (a) Glare angrily at the other driver as you move on to find another parking spot
- (b) Shrug your shoulders and look for another spot
- (c) Lay on your horn and inform the driver in no uncertain terms that they have taken your spot and should move at once
- (d) "Accidentally" scrape the car with your keys after you have found another spot

5. You are driving your vehicle in a traffic jam in the far lefthand lane. Out of nowhere, a car comes up from behind on the shoulder and attempts to squeeze in front of you. How do you respond?

- (a) Nothing, let the car squeeze in
- (b) Make obscene gestures, or yell "asshole" at the other driver as you close ranks on the car in front of you to prevent the driver from cutting in front of you
- (c) Let the car squeeze in but honk your horn to show your disapproval to the other driver
- (d) Honk your horn and close ranks on the vehicle in front of you to prevent the car from getting in front of you

6. You are driving on the highway when another vehicle pulls up alongside your car. You look over and see a total stranger making obscene gestures at you. How do you respond?

- (a) Ignore the other driver by looking straight ahead and minding your own business
- (b) Look at the other driver and shake your head in disbelief, then slow down and wait for the other car to drive on
- (c) Make obscene gestures back to the driver in the other vehicle
- (d) Yell obscenities at the other driver

7. You are driving on the highway. One of the cars in front of you keeps changing lanes, preventing other cars from overtaking efficiently. Thus traffic is being slowed. How do you respond?

- (a) Yell obscenities in your car and honk your horn numerous times to show your displeasure
- (b) Pull up next to the other car so that you can honk your horn and scream obscenities at the driver blocking traffic
- (c) Yell out obscenities in your car
- (d) Change lanes and move away so the driver doesn't affect you anymore

8. You are driving on a city street. Without warning, a pedestrian suddenly runs in front of your car, nearly causing you to hit him/her. How do you respond?

- (a) Do nothing except feel grateful no one was injured
- (b) Yell at the pedestrian out your window telling them to watch where they are going
- (c) Curse loudly at the pedestrian out your window telling them next time you're not going to stop
- (d) Stop the car and make sure the pedestrian is okay, while kindly telling them to be more careful

9. You are trying to exit off the highway. However, a car coming on to the highway has failed to acknowledge a give-way sign and their behaviour has caused you to miss the exit. How do you respond?

(a) Honk your horn at the other driver to demonstrate your displeasure

(b) Throw your hands in the air in disbelief and drive to the next exit

(c) Drive up next to the car that cut you off, honk your horn, and give the driver a mean look

(d) Flash your lights at the other driver and give him/her the finger

10. Your exit is quickly approaching. The driver next to you is driving in a manner that is preventing you from changing lanes. You may miss your exit. How do you respond?

(a) Hit the accelerator to get in front of the other car, yelling obscenities as you pass the other car

(b) Cursing under your breath, reduce your speed as necessary to make the lane change

(c) Follow the car to its destination so you can yell obscenities at the other driver

(d) Give the other driver the finger as you slow down to let them pass so you can exit

11. You are driving on the highway. The driver in the car in front of you throws a cup of coffee out his/her car window. The cup hits your windscreen. How do you respond?

(a) Honk your horn and yell at the other driver from within your car

(b) Speed up next to the car and make obscene gestures at the other driver

- (c) Speed up so that you pass the car and then throw something out your window to hit the other car
- (d) Curse to yourself and clean the windscreen using your wipers

12. While making a left-hand turn you accidentally cut off another car. In response, the other driver follows you to the next intersection at which point he/she pulls up to your car and proceeds to yell obscenities at you until the light turns green. When the light turns green the other driver takes off in a hurry. How do you respond?

- (a) Follow the car to the next intersection so that you can yell obscenities back
- (b) Sigh in relief that the whole ordeal is over
- (c) Yell back at the other driver telling him/her to relax because it was an accident
- (d) Lock your doors and keep heading to your destination

13. You are driving on the highway in the overtaking lane. You come up behind another car in the overtaking lane. You flash your headlights as an indicator for the other car to move over. Instead of moving over, you see the driver in the other car give you the finger and remain in the overtaking lane. How do you respond?

- (a) Get right on the rear bumper of the car, flash your lights, and honk your horn in order to intimidate the other driver into moving over
- (b) Roll your eyes in disbelief and wait for the car to move over or exit
- (c) Get right on the rear bumper of the other car and lay on your horn
- (d) Overtake the driver on the left, giving them a mean look as you pass

14. You are driving in the right-hand lane behind another vehicle.

When the right turn light is given, the vehicle does not move because the driver is not paying attention. You tap on your horn to get his/her attention and the driver gives you the middle finger in the rearview mirror. How do you respond?

- (a) Fume inside a bit, but do nothing
- (b) Lay on your horn
- (c) Lay on the horn and return the finger gesture
- (d) Gesture with your palms up and mouth "What are you waiting for?"

15. You are traveling in a single-lane road late at night and the vehicle coming at you in the other lane has on high beams. You flash your lights, but the bright lights of the other vehicle do not change. How do you respond?

- (a) Grit your teeth in frustration and wait for the car to pass so you can see again
- (b) Put on your high beams and honk your horn
- (c) Turn around and follow the other vehicle with your high beams on
- (d) Yell obscenities out your window when they pass

B. Depression Anxiety Stress Scale (DASS)

# DASS

Name:

Date:

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

*The rating scale is as follows:*

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

1	I found myself getting upset by quite trivial things	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I just couldn't seem to get going	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I had a feeling of shakiness (eg, legs going to give way)	0	1	2	3
8	I found it difficult to relax	0	1	2	3
9	I found myself in situations that made me so anxious I was most relieved when they ended	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting upset rather easily	0	1	2	3
12	I felt that I was using a lot of nervous energy	0	1	2	3
13	I felt sad and depressed	0	1	2	3
14	I found myself getting impatient when I was delayed in any way (eg, lifts, traffic lights, being kept waiting)	0	1	2	3
15	I had a feeling of faintness	0	1	2	3
16	I felt that I had lost interest in just about everything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I perspired noticeably (eg, hands sweaty) in the absence of high temperatures or physical exertion	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life wasn't worthwhile	0	1	2	3

*Please turn the page <*

*Reminder of rating scale:*

0 Did not apply to me at all

1 Applied to me to some degree, or some of the time

2 Applied to me to a considerable degree, or a good part of time

3 Applied to me very much, or most of the time

22	I found it hard to wind down	0	1	2	3
23	I had difficulty in swallowing	0	1	2	3
24	I couldn't seem to get any enjoyment out of the things I did	0	1	2	3
25	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
26	I felt down-hearted and blue	0	1	2	3
27	I found that I was very irritable	0	1	2	3
28	I felt I was close to panic	0	1	2	3
29	I found it hard to calm down after something upset me	0	1	2	3
30	I feared that I would be "thrown" by some trivial but unfamiliar task	0	1	2	3
31	I was unable to become enthusiastic about anything	0	1	2	3
32	I found it difficult to tolerate interruptions to what I was doing	0	1	2	3
33	I was in a state of nervous tension	0	1	2	3
34	I felt I was pretty worthless	0	1	2	3
35	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
36	I felt terrified	0	1	2	3
37	I could see nothing in the future to be hopeful about	0	1	2	3
38	I felt that life was meaningless	0	1	2	3
39	I found myself getting agitated	0	1	2	3
40	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
41	I experienced trembling (eg, in the hands)	0	1	2	3
42	I found it difficult to work up the initiative to do things	0	1	2	3

C. Deffenbacher Driving Anger Scale (Deffenbacher, Oetting & Lynch, 1994)

Instructions: Imagine that each situation described below was actually happening to you and rate the amount of anger that would be provoked.

*none at all*    *a little*    *some*    *much*    *very much*

1

2

3

4

5

1. Someone is weaving in and out of traffic.
2. A slow vehicle on a mountain road will not pull over and let people by.
3. Someone backs right out in front of you without looking.
4. Someone runs a red light or stop sign.
5. You pass a radar speed trap.
6. Someone speeds up when your try to pass him/her.
7. Someone is slow in parking and is holding up traffic.
8. You are stuck in a traffic jam.
9. Someone makes an obscene gesture toward you about your driving.
10. Someone honks at you about your driving.
11. A bicyclist is riding in the middle of the lane and is slowing traffic.
12. A police officer pulls you over.
13. A truck kicks up sand or gravel on the car you are driving.
14. You are driving behind a large truck and you cannot see around it.

### D. Cover Sheet

My name is Zacharia Moussa and I am conducting research in the Department of Psychology that explores factors that influence driver behaviour in adults with different types of licence using stress, anger and anxiety. This research is being conducted as part of my studies and will be submitted for examination.

You are invited to take part in this study and participation involves completing and returning the attached anonymous survey. While the survey asks some questions that might cause some minor negative feelings, it has been used widely in research. If any of the questions do raise difficult feelings for you, contact information for support services are included on the final page.

Participation is completely voluntary and so you are not obliged to take part.

Participation is anonymous and confidential. Thus, responses cannot be attributed to any one participant. For this reason, it will not be possible to withdraw from participation after the questionnaire has been collected.

The questionnaires will be securely stored and data from the questionnaires will be transferred from the paper record to electronic format and stored on a password protected computer.

It is important that you understand that by completing and submitting the questionnaire that you are consenting to participate in the study.

Should you require any further information about the research, please contact my college email

@mydbs.ie.

My supervisor can be contacted at | @dbs.ie.